

Learning Objectives.

- 1) Find Domain of complex Functions.

Domain: (Definition): The set of all values for which a function is defined. (x – values)

To find the domain of a function you must find all values that produces a real result. In class we discussed a process for finding domain.

- 1) Start with all real numbers.
- 2) Limit the domain based on 3 rules.
 - a. Remove any number that causes a division by zero.
 - b. Remove any number that causes an even root of a negative number.
 - c. Any value that does not make sense in the context of the problem.

Example of a:

Find the domain of the following function. $f(x) = \frac{x-2}{x^2+x-6}$. We start with all real numbers

but since the denominator of $f(x)$ factors to $f(x) = \frac{x-2}{(x-2)(x+3)}$ we easily see that both

$x = 2$ and $x = -3$ So the domain for $f(x)$ is “All real numbers where $x \neq 2$ $x \neq -3$ ”

Example of b:

Find the domain of the following function. $f(x) = \sqrt{4-x^2}$. We start with all real numbers, but since any value of x where $x < -2$ or where $x > 2$ causes the square root of a negative number, which is an imaginary result. Any value of x that produces an imaginary result must be removed from the domain. Therefore the Domain of $f(x)$ is “All real numbers where $-2 \leq x \leq 2$.

Example of c.

The volume of a box made from a piece of cardboard with a square bottom is defined by the function $V(x) = (100 - 2x)x^2$. Where x is the length of one side of the base in inches and V is the volume of the box in inches cubed. What is the domain of the function?

Since V is a polynomial function, normally we would say that the domain is all real numbers. But, x is defined as a length, therefore it cannot be negative. So x must be greater than zero. Also the volume cannot be negative and any value for x that is greater than 50 will make the volume negative. So the domain of V is “All real numbers where $0 < x < 50$ ”

Practice Problems

Find the domain of the following functions.

1) $f(x) = \frac{2x-5}{x+4}$

2) $f(x) = \sqrt{x-4}$

3) $f(x) = x^2 + 3x - 5$

4) $f(x) = \frac{\sqrt{16-x^2}}{x}$

5) The volume of a box made from a piece of cardboard with a square bottom is defined by the function $V(x) = (50-2x)^2 x$. Where x is the length of one side of the base in inches and V is the volume of the box in inches cubed. What is the domain of the function?

6) The demand for a certain number of TV's is defined as the linear function $p = 1000 - 1.5x$ where p is the price in dollars for the number of TVs demanded x (in 100's of TV's)

Congrats you are finished with Pre-Calculus Blizzard Bag #1